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A Five-Year Survey of Canine Nephritis

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A FIVE-YEAR SURVEY OF CANINE NEPHRITIS

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THE CASE REPORTS ON CANINE NEPHRITIS in Stange Memorial Clinic at Iowa State College were summarized for the last five years. The incidence of nephritis in the various breeds, sexes, age groups and seasons of the year were covered. Etiology, length of sickness, complications, treatments used, post-mortem findings ,clinical laboratory findings, condition upon discharge, length of hospitalization, history and symptoms of the patients were all summarized.

In the last five years, 137 cases have been diagnosed as nephritis in this clinic. Of these, 41 cases were diagnosed as acute or subacute nephritis and 96 cases were diagnosed as chronic nephritis. The number of cases in each of the five years was as follows: 1954, 33 cases; 1955, 22 cases; 1956, 29 cases; 1957, 40 cases; and 1958, 13 cases. As with most conditions, the incidence of nephritis varied from year to year.

Season

The season of year seemed to influence the occurrence and type of nephritis. The incidence of chronic nephritis appeared to be higher in the winter, while the incidence of acute nephritis appeared more frequently in the spring and fall. Several reasons might help explain this. The cold weather might cause additional stress which could precipitate an attack of chronic nephritis. The cold weather could also cut down on the water intake and the number of urinations per day which might set off a chronic case. The acute cases might be explained by the fact that a larger number of dogs are loose and more active during the fall and spring and could be exposed to leptospirosis and other causes of acute nephritis.

TABLE 1. SEASON INCIDENCE

	Acute	Chronic		Acute	Chronic
January	6	13	July	3	6
February	4	16	August	1	3
March	2	14	September	7	5
April	1	11	October	3	9
May	7	4	November	1	6
June	4	7	December	2	2

Breed

The breed incidence of nephritis appeared to correlate quite well with the popularity of the breed involved. Since most of the chronic cases occurred at six to ten years of age, the number of chronic cases per breed indicated the popularity of that breed six to ten years ago. In this survey, it appeared that external factors, the condition and age of the dog had more influence on the incidence of nephritis than did the breed of the dog.

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TABLE 2. BREED INCIDENCE

	No. of Cases		No. of Cases
Mixed	31	Dalmatian	2
Cocker Spaniel	21	English Pointer	2
Terrier	15	Basenji	1
Dachshund	10	Cairn Terrier	1
Boston Terrior	6	Chesapeake	1
Boxer	6	Chow Chow	1
Beagle	5	Coonhound	1
Pekingese	5	Labrador Retriever	1
Irish Setter	4	English Bulldog	1
Norwegian Elkhound	4	Kerry Blue Terrier	1
Collie	3	Pug	1
German Shepherd	3	Schipperke	1
German Shorthair	3	Scottish Terrier	1
Springer Spaniel	3	Weimaraner	1
Airedale	2		

Sex

The incidence of nephritis was 25 per cent higher in males than in females. This was probably due to the male dog's habits, which exposed them to more of the causes of nephritis, such as leptospirosis.

Age

Age appeared to be an important factor in nephritis. Although nephritis occurred in young dogs, those from four years of age and older seemed to be affected more frequently. During the first four years the majority of cases were acute. From five years of age and up, a higher percentage of the cases became chronic. The average age for acute cases was 4.8 years and the average age for chronic cases was 8.5 years. The oldest dog in this study to have an acute case was ten years old.

Table 3.
AGE INCIDENCE

Age in Years	Acute	Chronic	Age in Years	Acute	Chronic
1	7	2	9	4	3
2	2	3	10	1	11
3	2	6	11	0	4
4	9	4	12	0	12
5	7	11	13	0	7
6	3	5	14	0	4
7	3	8	15	0	3
8	3	11	16	0	2

Etiology

The etiology of nephritis was frequently very hard to determine. Leptospirosis was often thought to be one of the main causes of acute nephritis. Some of the same dogs that suffered acute attacks appeared healthy until later in life, and then showed symptoms of chronic nephritis.

In this study it was felt that leptospirosis was the cause in at least 17 cases. Renal calculi were responsible for four cases, bacteria for 11 cases, toxic conditions for seven cases and the causes of the remainder were unknown.

History and Symptoms

The history and symptoms given depended on the stage of the nephritis. The symptoms reported most frequently in acute cases were vomiting, elevated temperature, weakness, depression, diarrhea, dyspnea, soreness over kidneys, stiff hind legs, concentrated urine and bloody urine. The chronic cases most often showed normal or subnormal temperatures, vomiting, polydipsia, polyuria, dermatitis, weakness, sluggishness, loss of weight, stiffness in hind legs, constipation, anemia and hair shedding. In the terminal stages of uremia, the cases showed uremic breath, mouth ulcers and muscular twitches.

Table 4.
HISTORY AND SYMPTOMS

	No. of cases		No. of cases
Anorexia	47	Dyspnea	8
Normal temperature	42	Sore back	7
Vomiting	35	Constipation	6
Polydipsia	22	Subnormal temperature	6
Polyuria	19	Stiff hind legs	6
Dermatitis	17	Bloody urine	5
Elevated temperature	15	Concentrated urine	5
Weak and sluggish	14	Anemia	5
Diarrhea	12	Shedding	4
Loss of weight	9	Urinary incontinence	2
Ulcers in mouth	8	Muscular twitches	1
Uremic breath	8		

Clinical Laboratory Reports

Numerous laboratory methods aided in the diagnosis, prognosis and evaluation of

treatments used in the nephritis cases. The most frequently used tests were the white blood cell count, urinalysis and blood urea nitrogen test. Of the urine analysis tests, the reaction, albumin, specific gravity, sediment, chlorides, sugar and liver function were used most frequently. Urine analysis tests used less frequently were the occult blood, indican, acetone and bile tests. Other tests used were the differential white blood cell count, red blood cell count, hemoglobin, hematocrit, sedimentation rate, icterus index and clotting time. The Rochester Bedside Lab (Rochester Products Co., Rochester, Minnesota) was used occasionally to check the plasma level for the total base, sodium, bicarbonate and chlorides. The electrocardiograph was used when indicated to diagnose potassium intoxication, especially in acute cases.

The tests used most frequently by the author were the blood urea nitrogen test, white blood cell count, hematocrit, and urine analysis (pH, specific gravity, albumin and sediment). Many of the other tests were used less frequently, mainly to help diagnose other conditions occurring with nephritis.

Table 5.

CLINICAL LABORATORY TESTS

	No. of cases tested
Urinalysis	
Albumin	103
Reaction	95
Liver function	75
Sediment	70
Specific gravity	69
Sugar	65
Chlorides	34
Bile	10
Indican	10
Occult blood	9
Acetone	5
B.U.N.	69
W.B.C.	67
R.B.C.	52
Hemoglobin	46
Differential	38
Hematocrit	21
Sedimentation rate	5
Icterus test	5
Clotting time	3
Rochester Bedside Lab	3
Na^+	
Cl^-	
HCO_3	
Total base	
E.K.G.	2

Complications

Frequently, especially in the older dogs, other conditions besides nephritis were present. In this study the most frequent complication was valvular endocarditis. Hepatitis was another common complication. Dermatitis was sometimes found in chronic nephritis cases. These dermatitis cases usually had a blood urea nitrogen of 40 to 100 mg. per cent, but showed very few other clinical signs. Other complications which occurred were urinary incontinence, intestinal parasites, anemia, cystitis, prostatitis and pancreatitis.

Table 6.

COMPLICATIONS

	No. of cases		No. of cases
Heart conditions	26	Pneumonia	1
Dermatitis	17	Diabetes mellitus	4
Hepatitis	14	Prostatitis	4
Internal parasites	12	Pancreatitis	4
Cystitis	8	Renal calculi	2
Anemia	5	Cushing's syndrome	1
Urinary incontinence	4		

Treatments

Many different treatments were used on cases diagnosed as nephritis. The treatments varied depending on whether the case was acute or chronic nephritis. Many times, especially in severe cases, only symptomatic treatment was used.

Of the antibiotics, penicillin, streptomycin, Aureomycin (American Cyanamid Co., Danubury, Conn., Terramycin (Pfizer Laboratories, Brooklyn, N.Y.), Panmycin (The Upjohn Co., Kalamazoo, Mich.), Albamycin (The Upjohn Co., Kalamazoo, Mich.), Magnamycin (Pfizer Laboratories, Brooklyn, N.Y.), Chloromycetin (Parke, Davis & Co., Detroit, Mich.), and Chloromycetin Palmitate (Parke, Davis & Co., Detroit, Mich.) were used at one time or another during the five year period.

Various vitamins, minerals, general supplements, and metabolic regulators were used. Vitamins A, B complex, B_{12}, K, and multiple vitamins were tried. Livitamin (S.E. Massengill Co., Bristol, Tenn.), ferrous sulfate (United Research

Lab., Inc., Philadelphia, Pa.), Ferrobevex (Pitman-Moore Co., Indianapolis, Ind.) and Anabolin (Warner-Chilcott Lab., Morris Plains, N.J.) were used when indicated.

Due to the gastro-enteritis often present in nephritis, protectives such as bismuth subnitrate, pectin, Mulsed (Pitman-Moore Co., Indianapolis, Ind.) and Creamalin (Winthrop Laboratories, New York, N.Y.) were tried.

Chemicals such as ammonium chloride, sodium acid phosphate, Methenamine (Haver-Lockhart Lab., Kansas City, Mo.), Urised (Chicago Pharmacal Co., Chicago, Ill.), impregnated sodium chloride (Morton Salt Co., Chicago, Ill.) and sodium bicarbonate were also used in the treatment of nephritis cases.

Since anorexia, vomiting, and diarrhea were often present, fluid therapy was very important part of the nephritis treatments. Five per cent dextrose, Parenamine (Winthrop Lab., New York, N.Y.), blood transfusions, oral amino acids, normal electrolytes and saline-dextrose solutions were used when needed.

To help control the dermatitis seen in chronic cases, Seleen (Abbott Laboratories, Chicago, Ill.) and Dermatabs (Pitman-Moore Co., Indianapolis, Ind.) were two products tried.

K/D (Hill Packing Co., Topeka Kansas), and Nephrodiet (Atlas Canine Products, Inc., Brooklyn, N.Y.) were used as special diets to help control chronic nephritis.

A number of symptomatic treatments were used, such as Depropanex (Merck Sharp & Dohme, Inc., Philadelphia, Pa.) to relieve urethral obstruction and Thorazine (Pitman-Moore Co., Indianapolis, Ind.) to help prevent vomiting.

One peritoneal lavage was used on an acute case of lepospirosis. Since the dog was starting to show clinical signs of potassium intoxication, the treatment was unsuccessful. However, from experimental work being carried on by the author, it appears that the peritoneal lavage definitely has a place in the treatment of nephritis, especially in acute cases.

At the present time, a fairly new treatment outlined by Huff and Pearson* is being used in the treatment of chronic nephritis cases. Many of the chronic cases have a sodium loss nephritis. With this type of condition, the body tries to conserve all the sodium possible. By retaining the sodium, the body also retains a higher percentage of the nitrogenous waste products, which in turn lead to the uremic syndrome. By giving high levels of sodium in the form of sodium chloride and sodium bicarbonate, both the excess sodium and a higher percentage of the nitrogenous waste products are eliminated from the body. With this treatment it was possible to lower blood urea nitrogen from 280 mg. per cent down to 60 mg. per cent with a similar decrease in clinical symptoms. So far, patients have been kept alive several months longer with this treatment. Eventually the progressive nephritis makes even this treatment inadequate.

Length of Hospitalization

Thirty-seven of the 137 patients were handled as outpatients. One case was kept in the hospital for 36 days. The majority of the cases were kept 12 days or less. The average length of hospitalization for all the cases was seven days.

Condition upon Discharge

Of the 137 cases, 36 cases were better upon discharge. Forty-five cases showed no improvement but 37 of these were outpatients, so only eight hospital cases were the same when discharged. Twenty-nine cases died and 16 cases were euthanized. The outcome on 11 cases was not known.

The success one has in treating nephritis depends a great deal on the severity of the cases being treated. Since many of our cases were hopeless cases referred by veterinarians throughout Iowa and surrounding states, our percentage of recoveries was fairly low.

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* *Huff, R. W. and Pearson, P. T., "Clinical Aspects of Canine Nephritis," presented to the Mass. Vet. Med. Assoc., Boston, Mass., 1957.*

Post-mortem Findings

Forty-one cases sent to post-mortem were diagnosed as nephritis. Thirty-four of these had lesions of chronic nephritis. Only seven cases had acute nephritis lesions. A number of other conditions were found with uremic lesions, valvular endocarditis and hepatitis being the most common. Of the hepatitis cases, four were diagnosed as acute hepatitis, four as fatty degeneraiton, three as chronic cirrhosis, and two as chronic hepatitis. Other less common conditions noted were renal calculi, cystitis, anemia, pneumonia, hydronephrosis, pancreatitis and prostatitis.

Table 7.
POST-MORTEM FINDINGS

	No. of cases		No. of cases
Chronic nephritis	34	Pneumonia	2
Uremic lesions	19	Prostatitis	2
Valvular endocarditis	18	Toxic nephritis	2
Hepatitis	13	Anemia	1
Acute nephritis	7	Diabetes mellitus	1
Calculi	4	Encephalitis	1
Cystitis	4	Malignant lymphoma	1
Pancreatitis	2		

Conclusion

The usual problems of summarizing case reports were experienced. Some of the reports were incomplete or completely lacking in essential information. With the lack of controls it was rather hard to draw many sound conclusions. Also several clinicians and many students were involved in the write-up of case reports, thus making it hard to get equal evaluation on all the cases. However, I feel that worthwhile information was gained from this survey.

The author wishes to thank Dr. D. L. Baker, Dr. E. C. Jensen, Dr. Margaret Sloss and the Pathology Department for providing much of the material used in this survey.

End

Chiggers do not burrow into the skin nor do they suck blood. They attach themselves to a hair and inject a fluid which breaks down the epidermal cells on which they live.